

Seattle Waste & Recycling Trends, Metrics and Goals

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Measuring Recycling Success

Volume

Litter

Participation rates

Safety

Residue
Air quality

Cost-benefit ratio

Equitable customer service

Lifecycle impacts

Workforce development

Diverted Tons

Product-to-packaging ratio

Efficiency

Closed loop

Capture rates

Water quality

Contamination

Toxicity

Public awareness

Generation rates

Job creation

Customer engagement

Processing

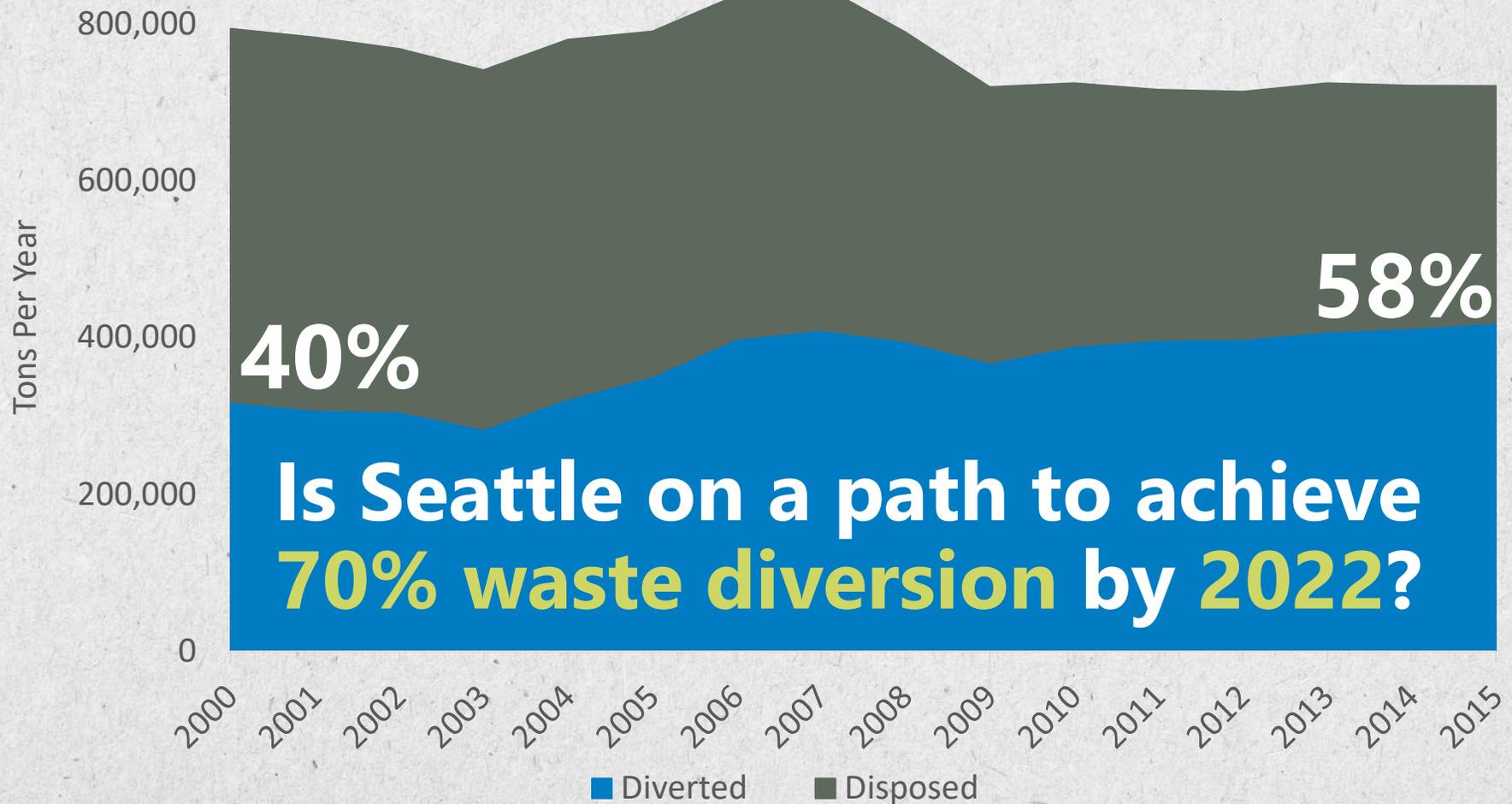
GHG emissions

Customer engagement

costs

Tipping fees

Market values



DATA SOURCE: 2015 Recycling Rate Report

Is it the **right goal?**

70% waste diversion by 2022

What is **missing** from the equation?

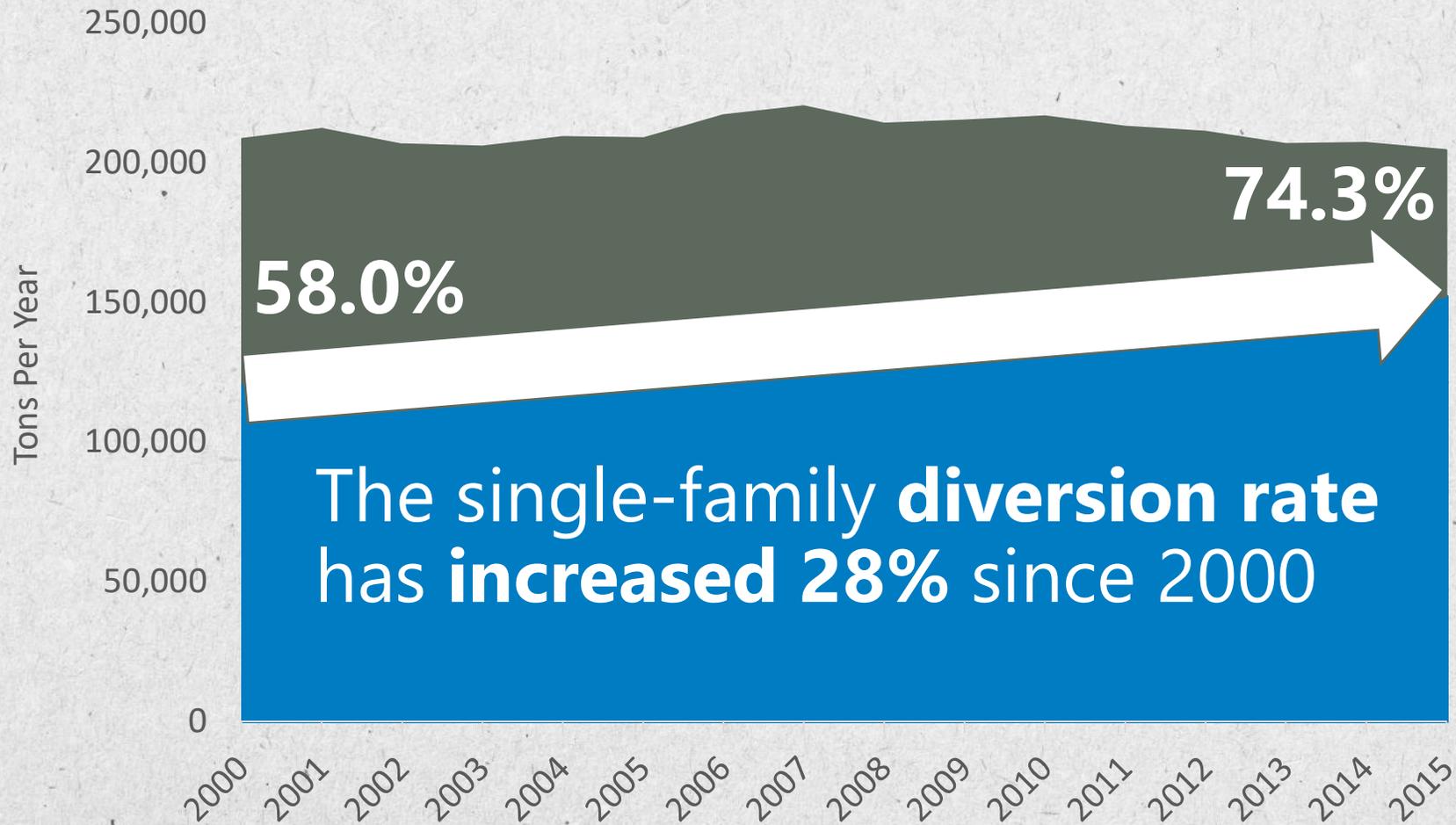
70% waste diversion by **2022**

Residential Recycling:

**How far have we come?
Where are we heading?
What's left to do?**

Single Family Waste Generation and Diversion

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

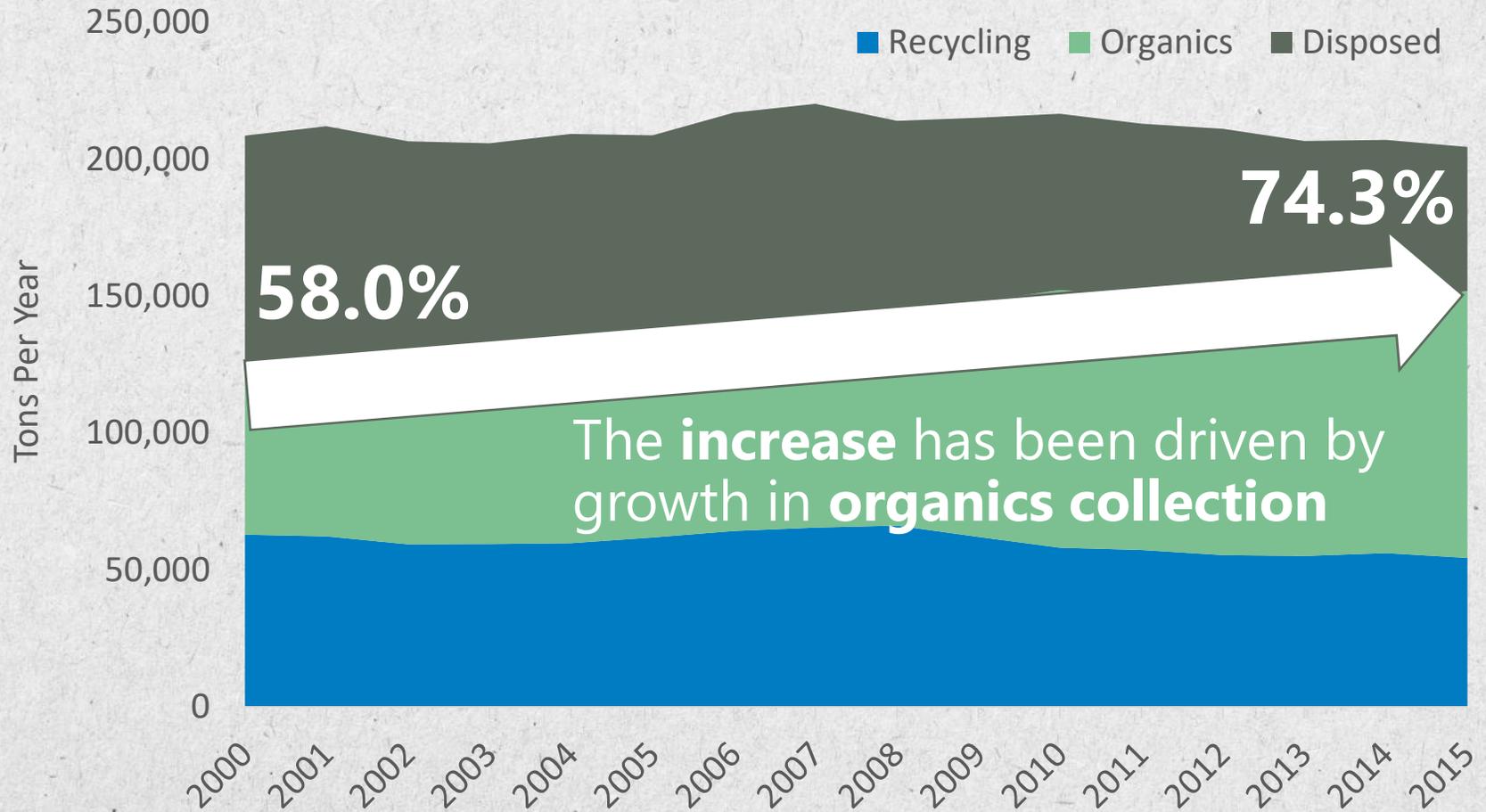


The single-family **diversion rate** has **increased 28%** since 2000

DATA SOURCE: 2015 Recycling Rate Report

Single Family Waste Generation and Diversion

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015



DATA SOURCES: 2015 Recycling Rate Report & Q4 2015 Recycling Programs Report*
*for tons of SF recycling tonnage w/o contaminants.

Landfilled Waste Composition – % Recyclable

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

2002

2014

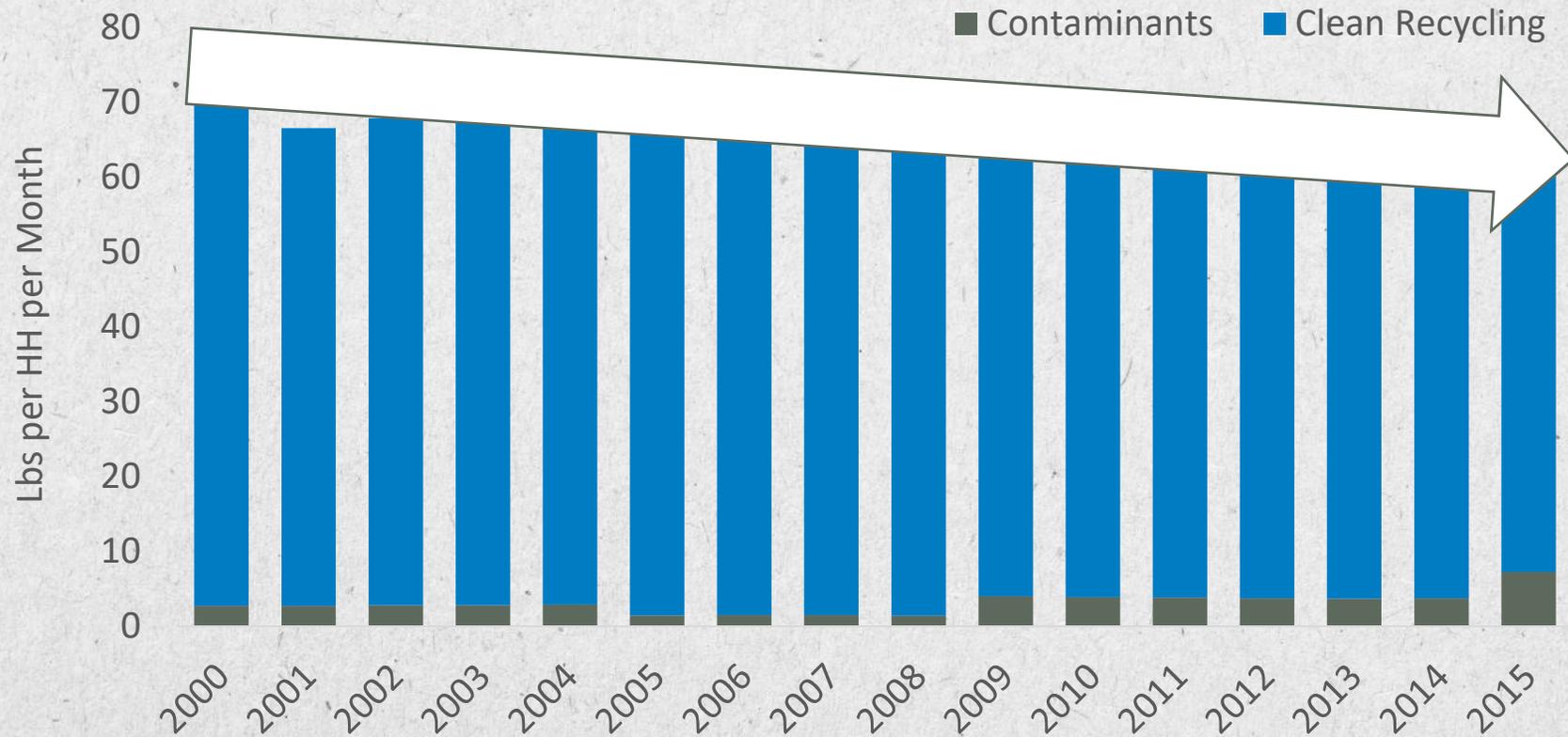


DATA SOURCES: 2002 Residential WCS Report & 2014 Residential WCS Report
Recyclable % est. based on Cascadia designation of material categories as "curbside recyclable."

Per Household Recycling (lbs/hh/mo)

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

Recycling lbs per household has dropped by 8%

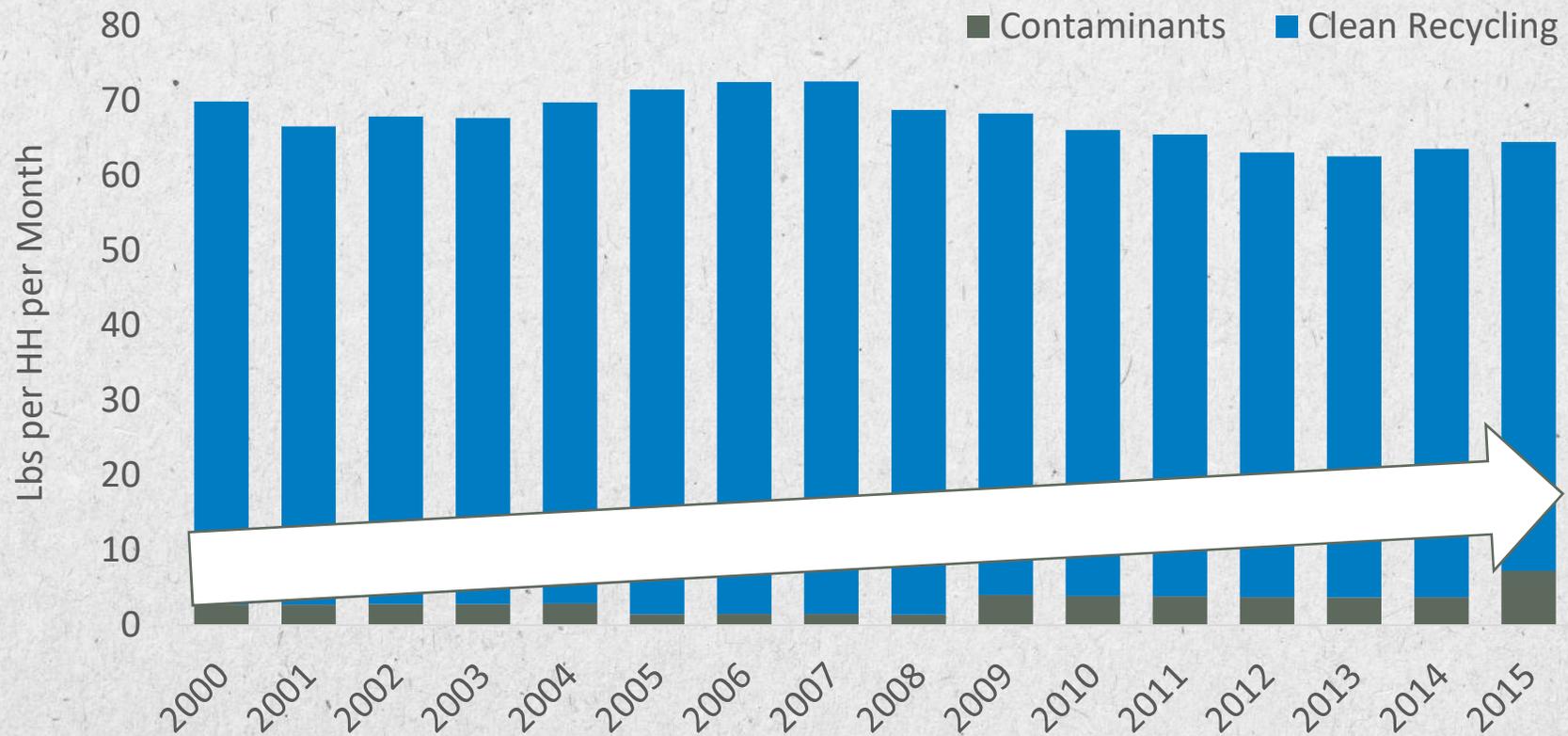


DATA SOURCES: Q4 2015 Recycling Programs Report & 2015 Recycling Characterization Study (unpublished)

Per Household Recycling (lbs/hh/mo)

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

Contamination has increased from 3.8% to 10.1%

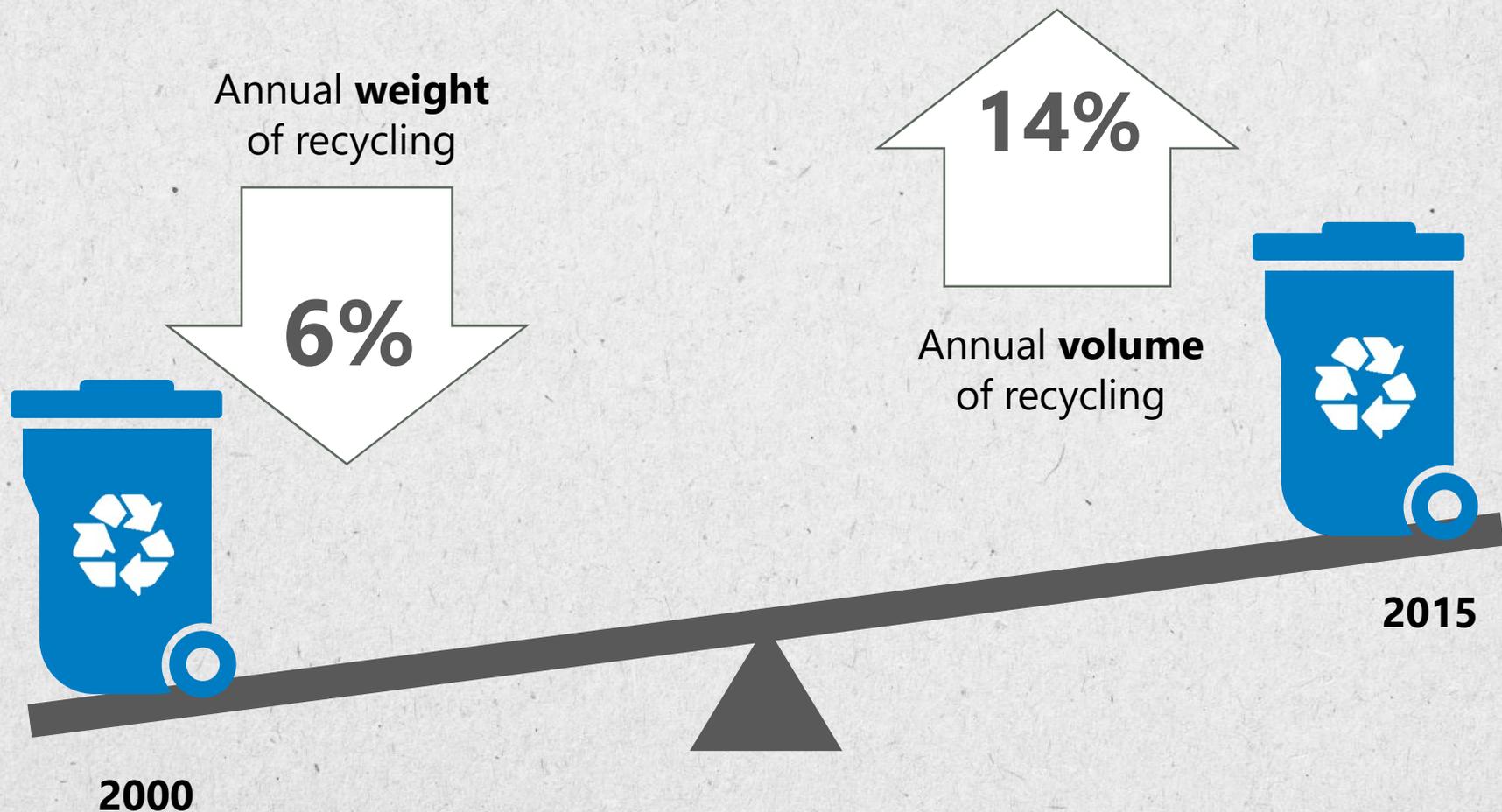


DATA SOURCES: Q4 2015 Recycling Programs Report & 2015 Recycling Characterization Study (unpublished)

Is residential recycling on the decline?

Recycling Weight v. Volume, 2000-2015

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

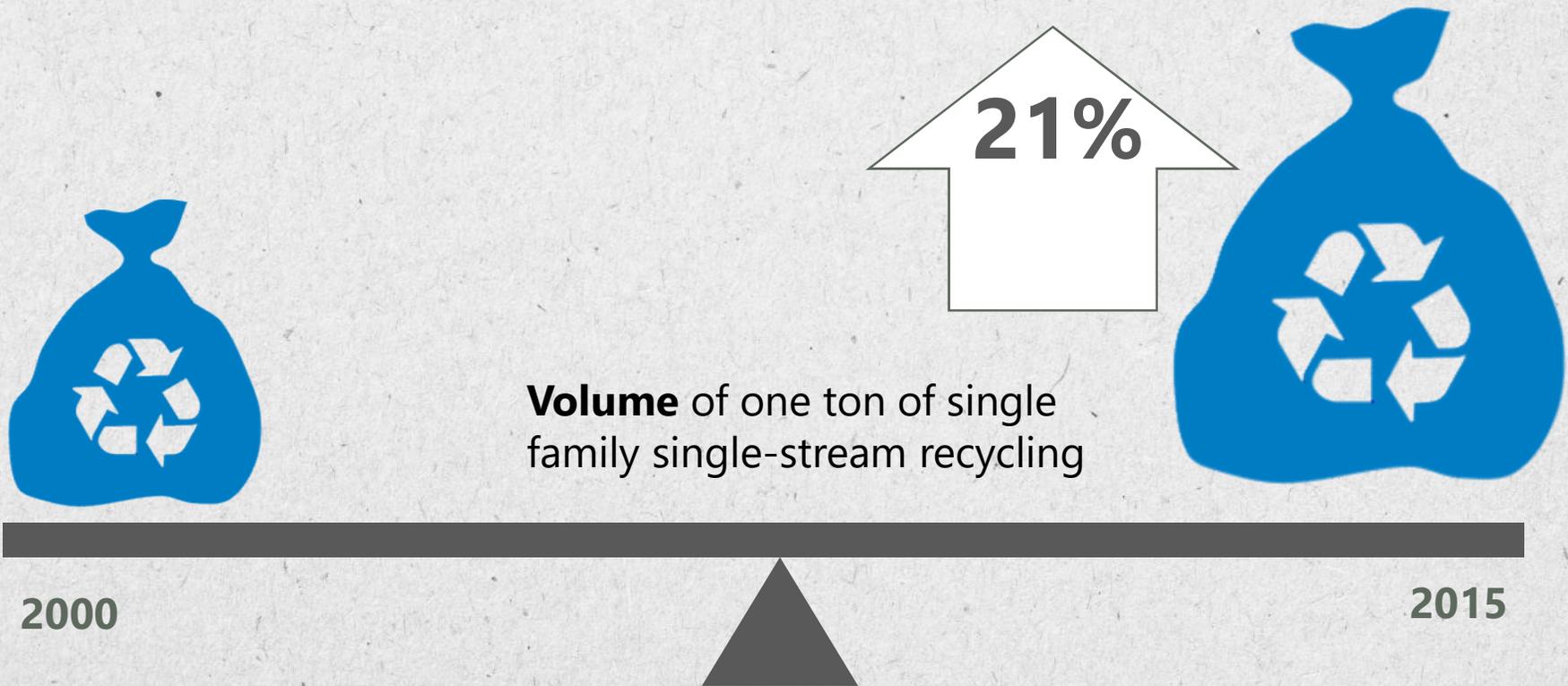


DATA SOURCES: Applied material-specific density factors to 2001 *Recycling Characterization Study* and 2015 *Recycling Characterization Study (unpublished)*. Weights come from Q4 2015 *Recycling Programs Report*.



Recycling Volume Per Ton, 2000-2015

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

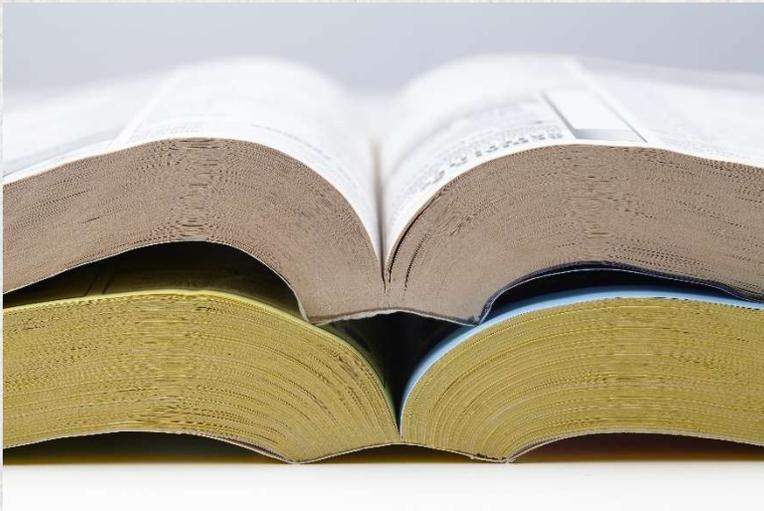


DATA SOURCES: Applied material-specific density factors to *2001 Recycling Characterization Study* and *2015 Recycling Characterization Study (unpublished)*. Density factors come more current public sources (*U.S. EPA, some Tellus, CIWMB*).

Drivers of Recycling Volume Changes, 2000-2015

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

City policy



Phonebooks: 8 cy³/ton

2000 = 1,402 tons

2015 = 261 tons

Changing consumer trends



Cardboard: 37.7 cy³/ton

2000 = 7,358 tons

2015 = 9,060 tons

DATA SOURCES: Phone books and directories = 250 lbs/cy³ (U.S. EPA); Uncoated corrugated cardboard = 53 lbs/cy³ (CIWMB 2004)
Q4 2015 Recycling Programs Report & 2015 Recycling Characterization Study (unpublished)

Drivers of Recycling Volume Changes, 2000-2015

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

Lightweighting of packaging



0.5 liter PET water bottle

17.5 grams
(2000)



9.5 grams
(2015)



12 oz. aluminum can

16.5 grams
(2000)



14.1 grams
(2015)

DATA SOURCES: www.nestle-watersna.com/en/sustainable-operations/pet-bottle/packaging-innovation &
<http://aluminium.org.au/FAQRetrieve.aspx?ID=45688>

Drivers of Recycling Volume Changes, 2000-2015

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

Material shifting of packaging (lightweighting 2.0)



Glass jars + metal lid
... to PET jar+ PP lid



Steel can + paper
label ... to multi-
layer, foil-lined
flexible film pouch



HDPE bottle + PP cap
... to multi-layer,
flexible film pouch

- Packaging is shifting to lighter-weight materials.
- Much of the light-weight packaging is not yet recyclable.
- Flexible film packaging is expected to grow 4-6.5% annually in the next few years.

DATA SOURCE: Waste Management, Inc.

Then and Now: Glass and Aluminum

2000

Sally hosts a party and serves a TON of beer in bottles



- 170 grams / bottle
- 1 Ton recycled
- Diversion rate 
- GHG benefit: 0.3 MTCO₂e for recycling

2005

Sally switches to serving her guests beer in cans



- 15 grams / can
- 176.5 lbs recycled
- Diversion rate 
- GHG benefit: 0.80 MTCO₂e for recycling

2015

Sally hosts her party at the brewery and treats guests to beer in pints



- No packaging
- 0 grams recycled
- Diversion rate 
- GHG benefit: 0.55 MTCO₂e for reducing

DATA SOURCE: U.S. EPA WARM, v.14

Then and Now: Cardboard and Flexible Packaging

2000

Sally and Harry buy boxed laundry detergent



- 100 grams / box
- 100 grams recycled
- 100% capture rate

2005

Sally and Harry's favorite brand switches to HDPE plastic bottles



- 50 grams / bottle
- 50 grams recycled
- 100% capture rate

2015

Sally and Harry's favorite brand switches to plastic pouches

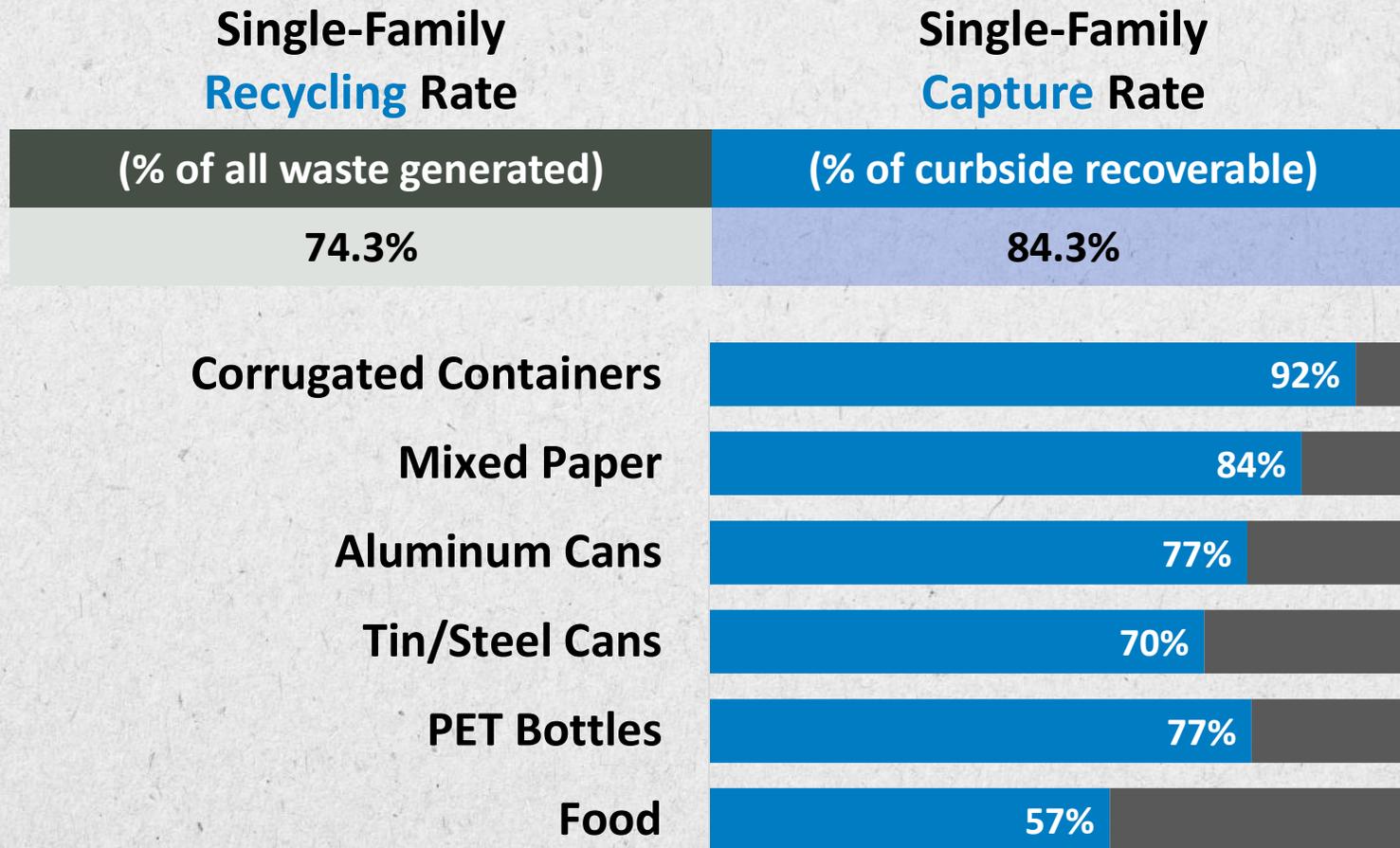


- 10 grams / pouch
- 0 grams recycled
- 0% capture rate

DATA SOURCE: U.S. EPA WARM, v.14

Material-Specific Capture Rates, 2015

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015



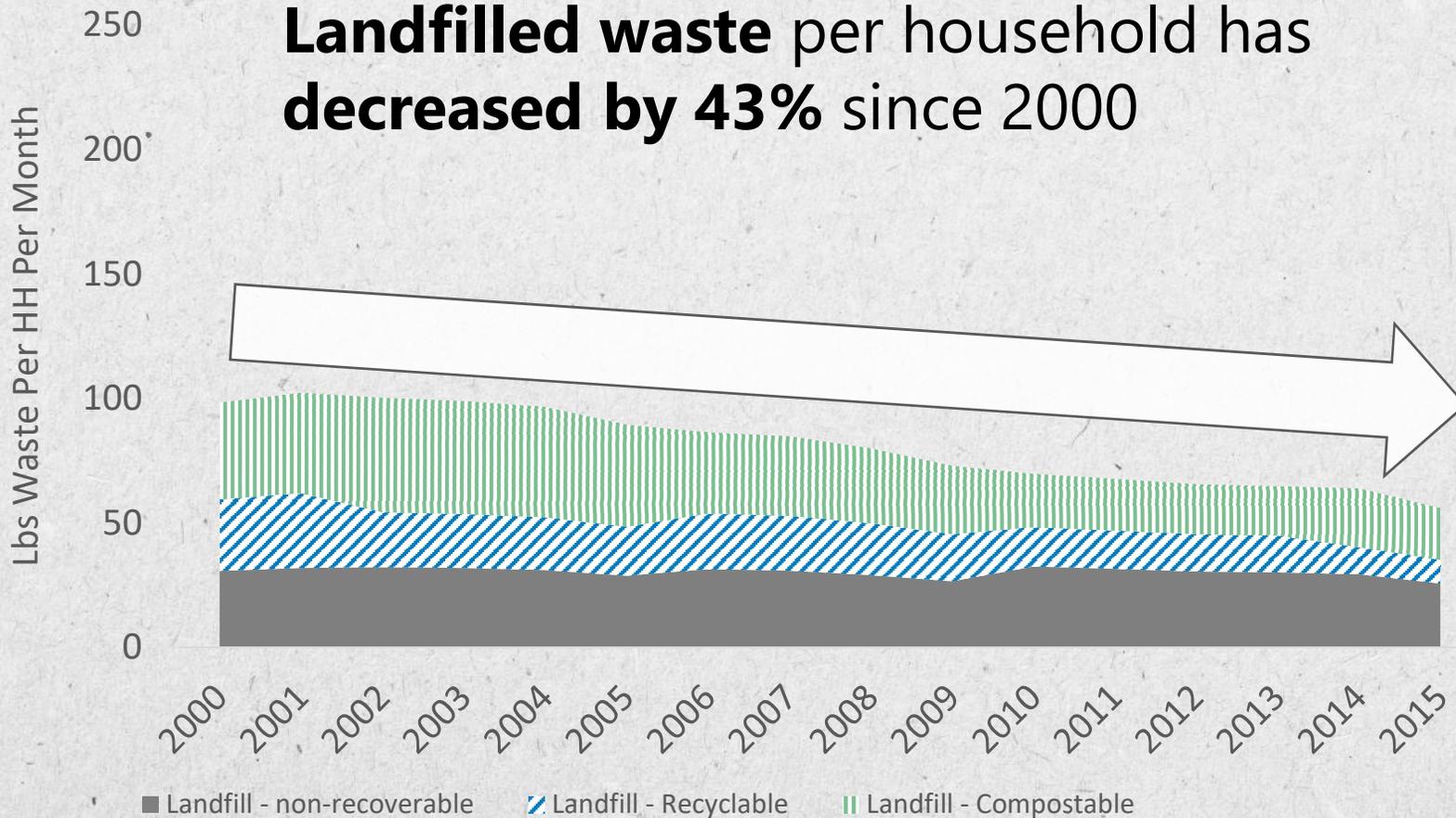
Curbside-collected recoverable data represents pre-processed tons

DATA SOURCE: Based on 2015 annual tons from 2015 Recycling Rate Report & Q4 2015 Recycling Programs Report. Composition from 2014 Disposal, 2015 Recycling, and 2012 Organics Composition Studies.

Landfilled Waste Per Household

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

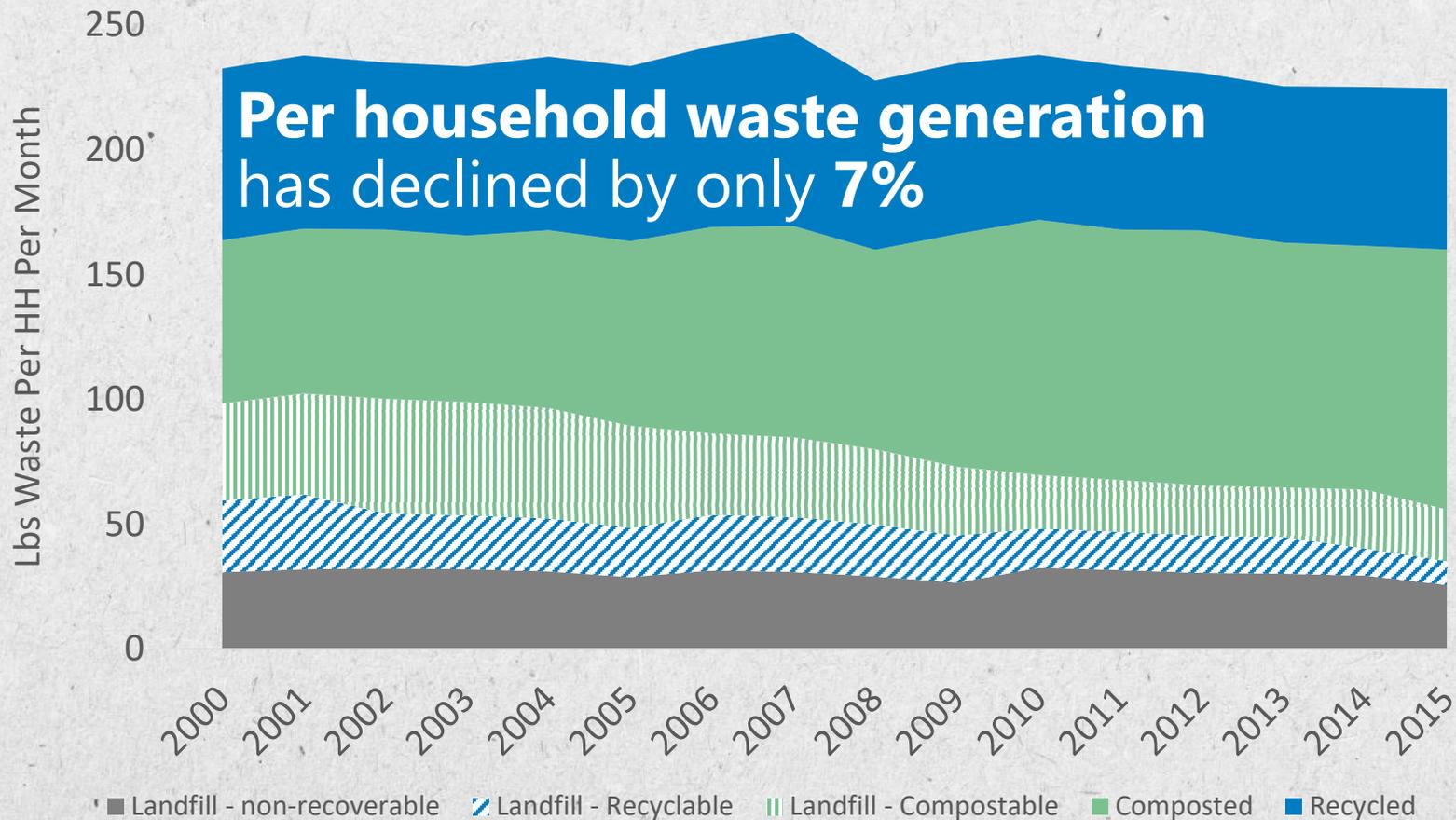
Landfilled waste per household has **decreased by 43%** since 2000



DATA SOURCE: Weights from 2015 Recycling Rate Report; household counts from Q4 Recycling Programs Reports (2000-2015), compositions from 1999, 2002, 2006, 2010, 2014 Waste Characterization Studies.

Total Waste Generated Per Household

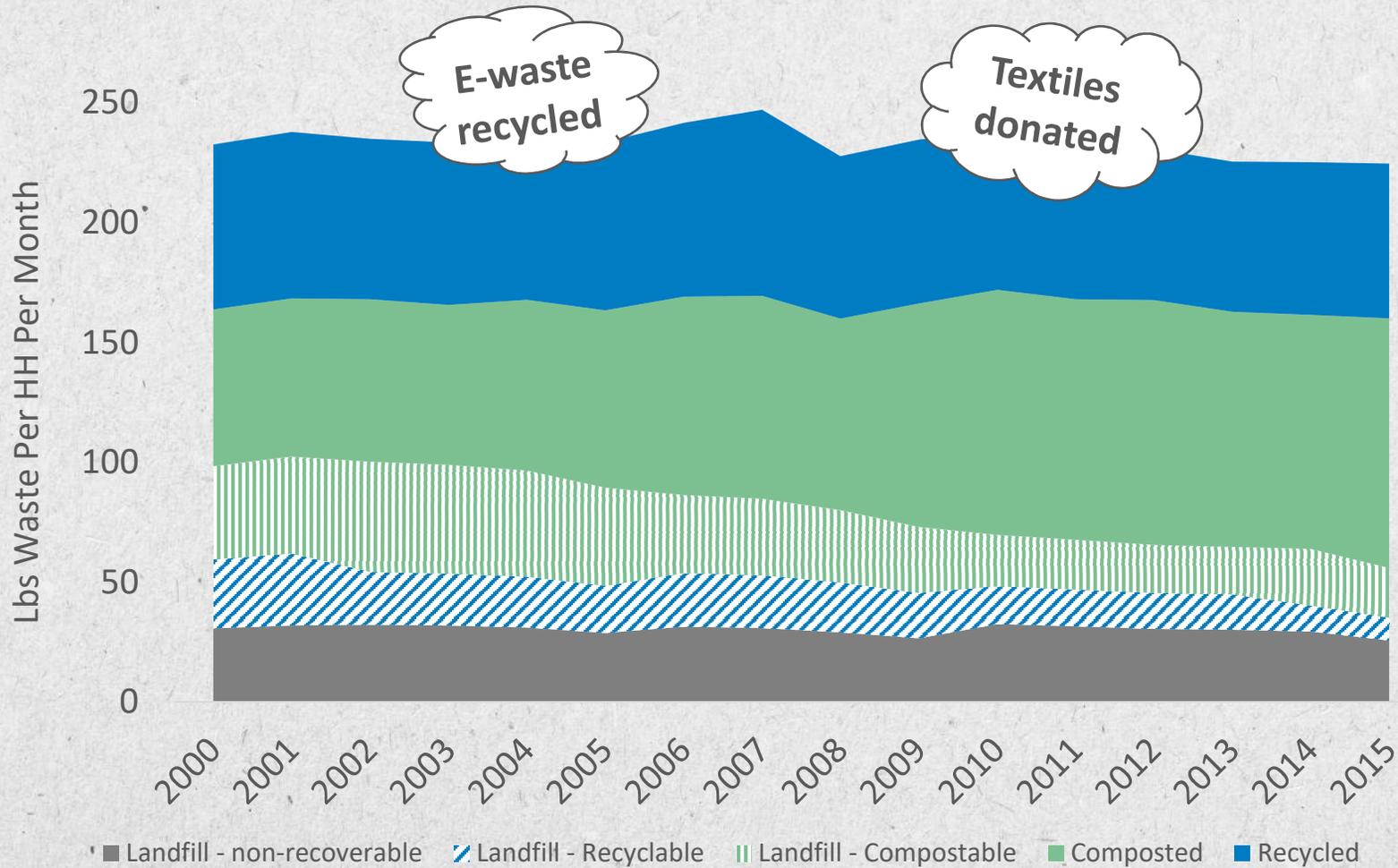
SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015



DATA SOURCE: Weights from 2015 Recycling Rate Report; household counts from Q4 Recycling Programs Reports (2000-2015), compositions from 1999, 2002, 2006, 2010, 2014 Waste Characterization Studies.

Total Waste Generated Per Household

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

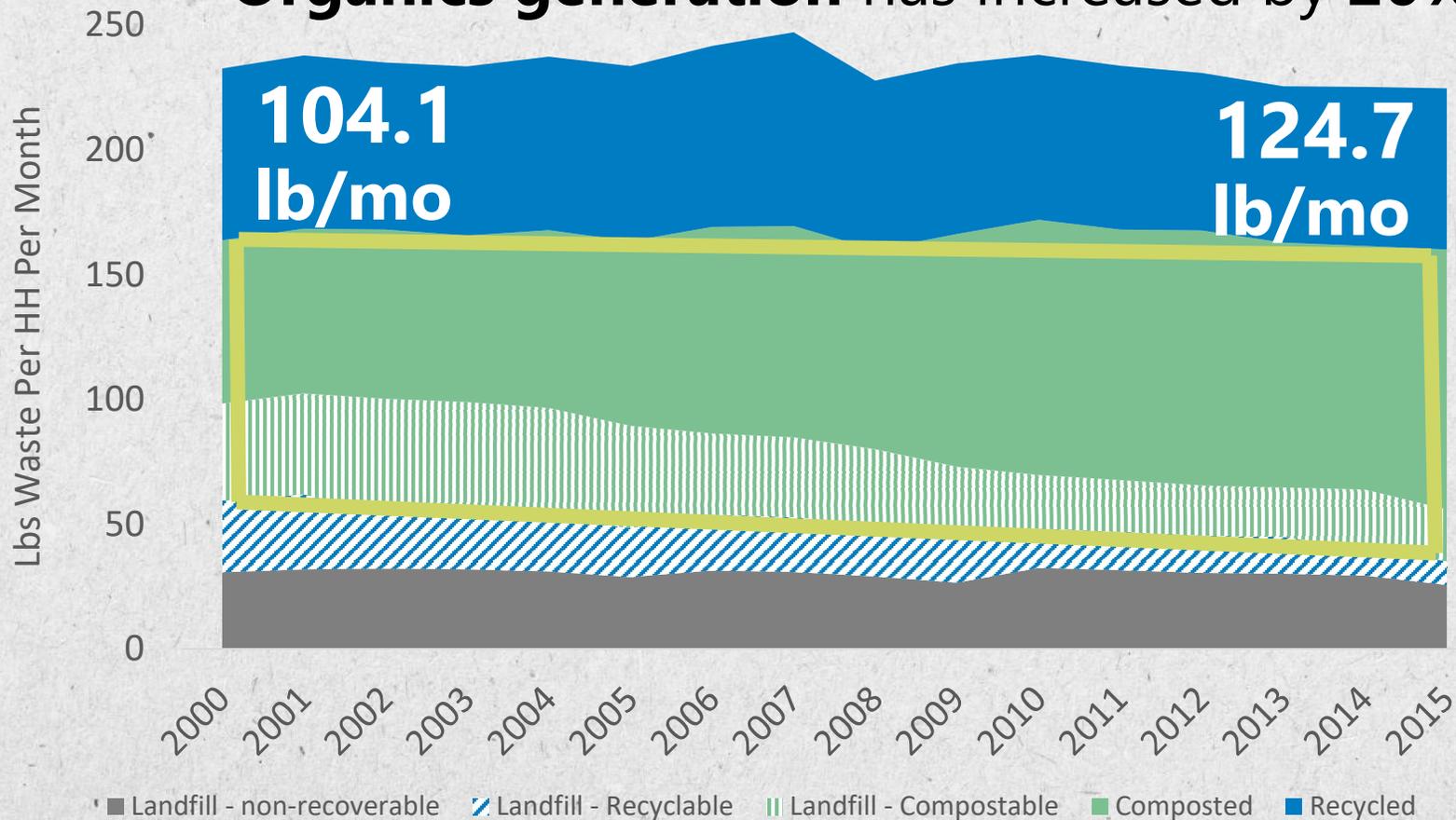


DATA SOURCE: Weights from 2015 Recycling Rate Report; household counts from Q4 Recycling Programs Reports (2000-2015), compositions from 1999, 2002, 2006, 2010, 2014 Waste Characterization Studies.

Total Waste Generated Per Household

SEATTLE SINGLE FAMILY WASTE AND RECYCLING TRENDS, 2000-2015

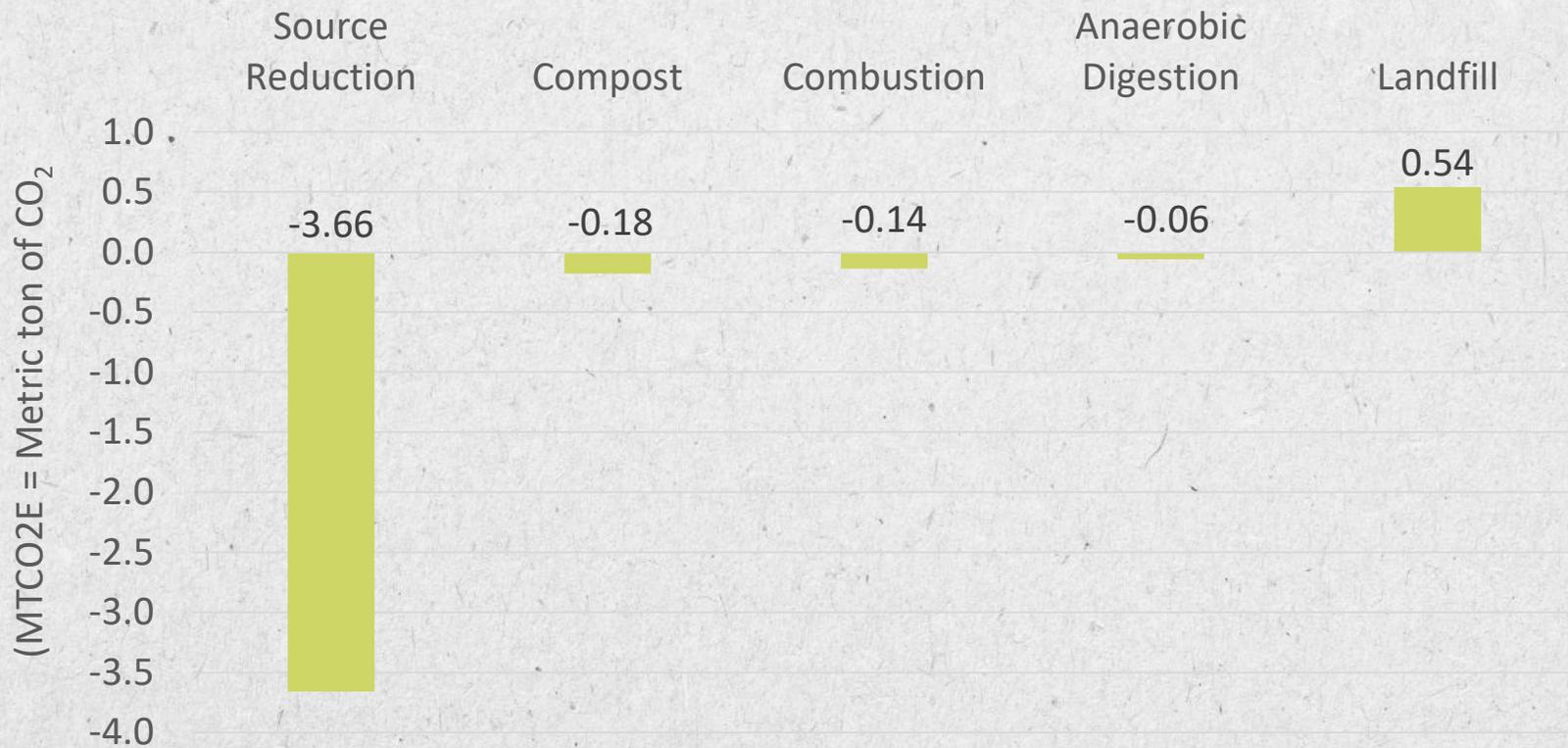
Organics generation has increased by **20%**



DATA SOURCE: Weights from 2015 Recycling Rate Report; household counts from Q4 Recycling Programs Reports (2000-2015), compositions from 1999, 2002, 2006, 2010, 2014 Waste Characterization Studies.

Food Waste Reduction Activities and Impacts

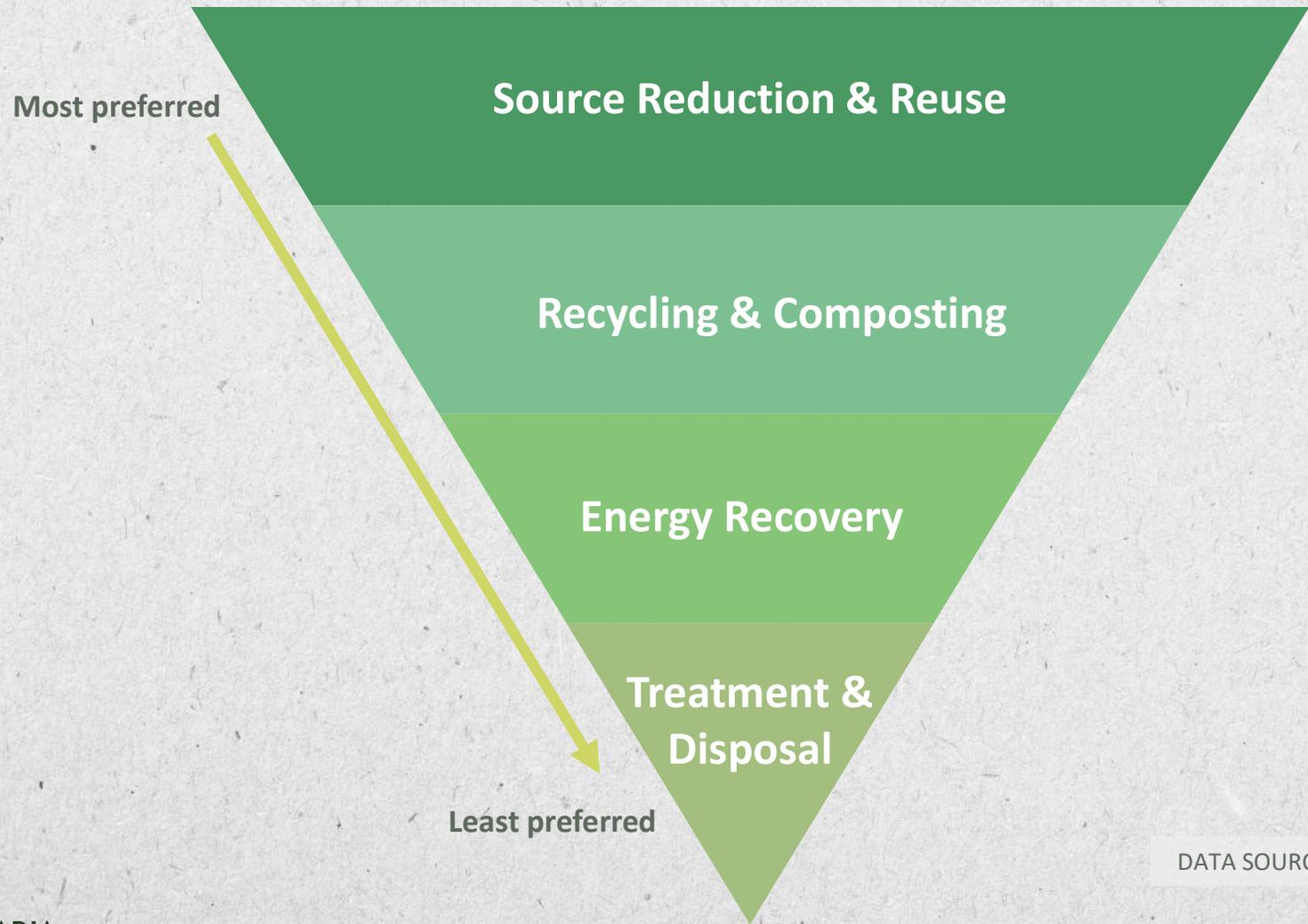
US EPA WASTE REDUCTION MODEL (WARM) BACKGROUND DATA



DATA SOURCE: U.S. EPA WARM, v.14

Total Waste Generated Per Household

Waste Management Hierarchy



DATA SOURCE: U.S. EPA

Recycling Metrics, Goals, and Impacts

BUSINESS CASE STUDY

Initial goal: 90% diversion rate

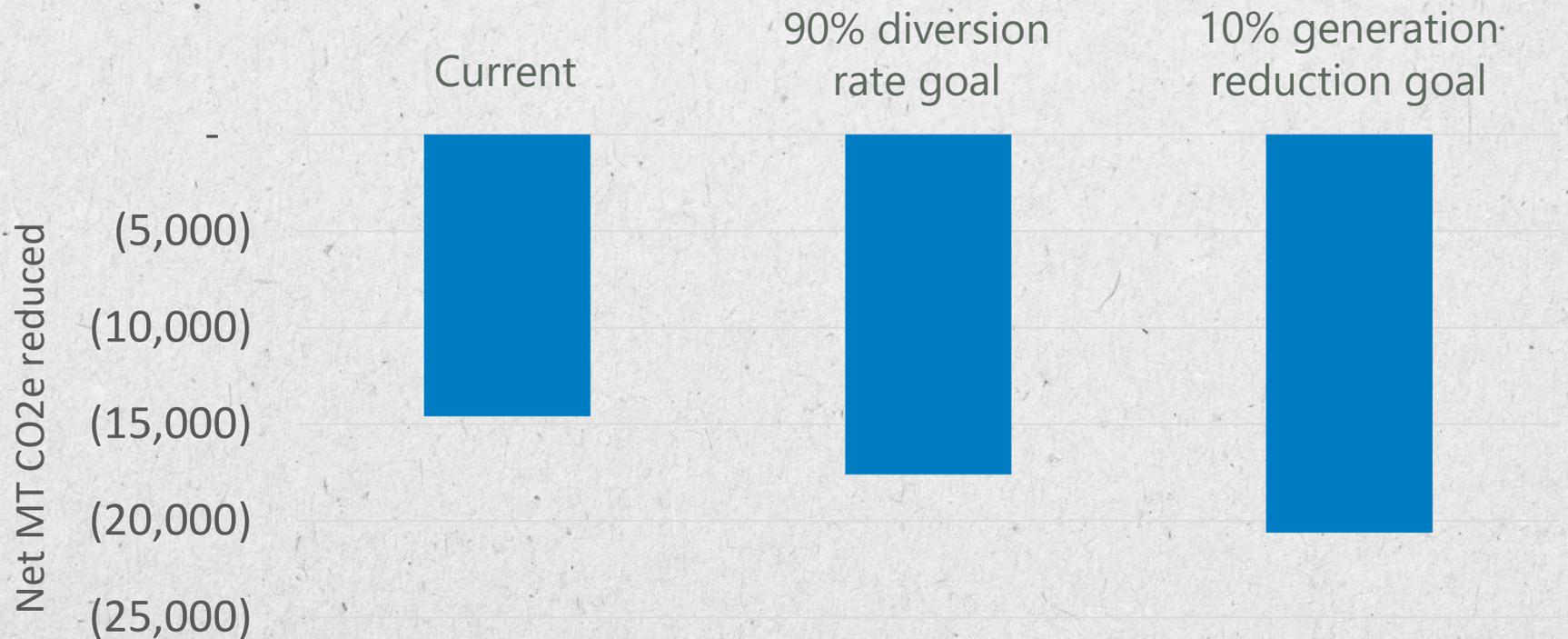


DATA SOURCE: *Cascadia Consulting Group, Inc.*

Recycling Metrics, Goals, and Impacts

BUSINESS CASE STUDY

Analysis: Account for GHG emission reduction potential

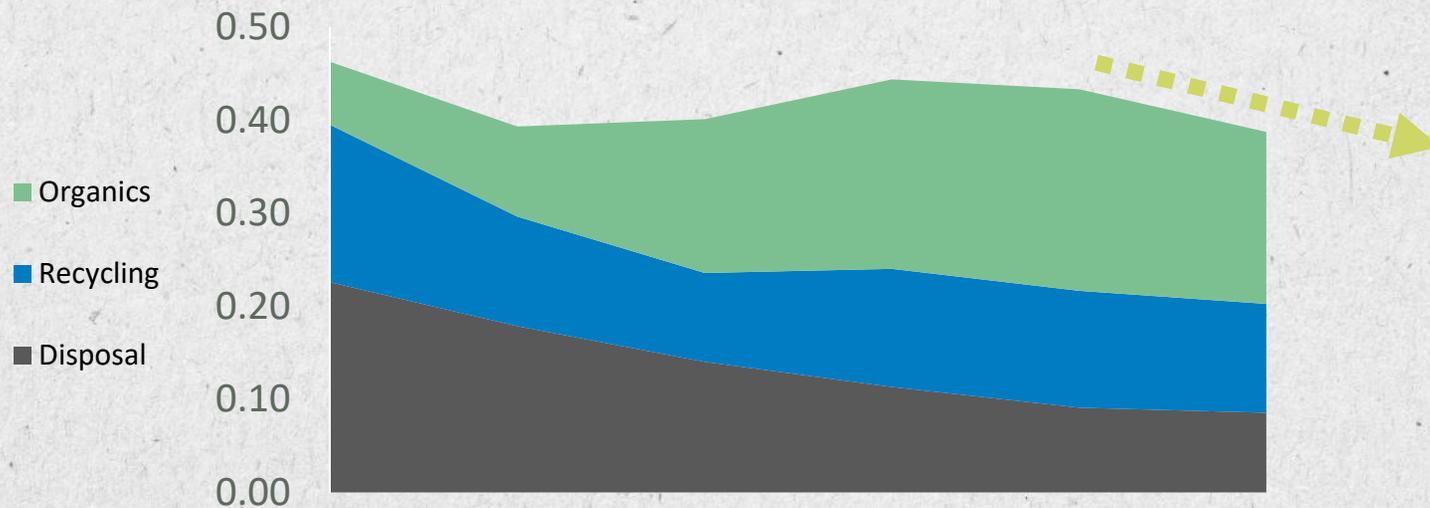


DATA SOURCE: *Cascadia Consulting Group, Inc.*

Recycling Metrics, Goals, and Impacts

BUSINESS CASE STUDY

Revised goal: Decrease per capita generation 10%/yr



	2010	2011	2012	2013	2014	2015
Recycling Rate	51%	55%	65%	74%	79%	78%
Per Capita Generation (TPEPY)	0.46	0.39	0.40	0.44	0.43	0.39

DATA SOURCE: Cascadia Consulting Group, Inc.

Closing Thoughts

- **Weight-based** diversion rate is helpful for:
 - Short-term tracking (easy to measure).
 - Communication (easy to describe and understand).
 - Benchmarking (comparing against others and the past).
 - Understanding program costs (driven by tons).

Closing Thoughts

- **Weight-based** diversion rate has limitations:
 - It distorts perception of recycling program success – people are recycling MORE than ever, it's just lighter.
 - It can distract the focus from what diversion is most environmentally beneficial to what weighs the most.
- Focus on weight-based diversion rate obscures the importance of total generation and the value of waste prevention.

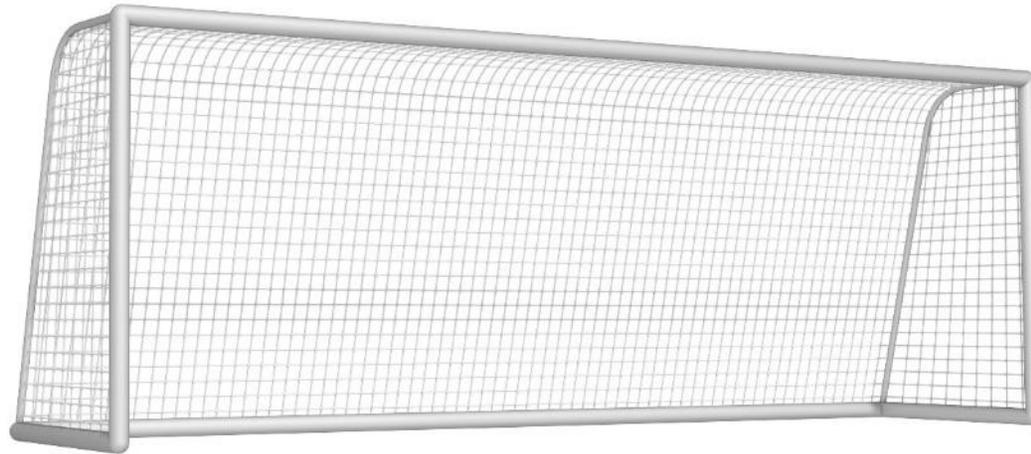
“There is no one perfect singular measure and no one right way to measure”



“Set the right goals – they will drive your impact”

What **goals** really matter?

What **metrics** can better align **measurement** with **goals**?



Thank you!

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